
Co-management Participation, Livelihood, and Status among Fishers in Baikka Beel, Bangladesh

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Abstract

Baikka Beel, a 100 hectare water body in Bangladesh, has been identified by local community members in conjunction with the Management of Aquatic Ecosystem through Community Husbandry (MACH) project as an area that could be protected as a wetland sanctuary without disadvantaging poor resource users. The sanctuary is protected through the Baragangina Resource Management Organization, which is comprised of members from 45 villages. In this paper I compare the statuses and livelihood patterns of fishers participating in the MACH project with those not participating. I also assess fishers' awareness and knowledge of state laws and regulations affecting fishing and fisheries management and examine the access that fishers have to water and associated common property resources. Study results suggest that the livelihoods (income, assets, and food security) of MACH fishers are better than that of non-MACH fishers. I also note differences between MACH and non-MACH fishers in terms of resource use, access to alternative income generating activities, socioeconomic status, and social perspectives.

Introduction

In Bangladesh wetlands are highly productive environments that support the livelihoods of millions of poor people. Bailey (1994) notes that fisher's and their families in South and Southeast Asia often are considered to be among the poorest of the poor. Hannan (1994) too states that fishers are traditionally poor and that fishing is considered to be a low-class profession. This despite the fact that for generations millions of rural people have depended on Bangladesh's flood plains, *beels* (deep depressions where water remains yearlong), rivers, *haors* (big depressions or low-lying floodplains that are inundated during the monsoon season creating vast sheets of water) and other wetlands for food and income. About 80% of rural households catch fish for personal consumption or sale (Thompson and Hossain 1998). The four million hectares of inland water bodies and floodplains in Bangladesh are among the world's richest fisheries. The Bangladesh flood plains have been divided up into over 12,000 state owned *jalmohals* or water estates (Islam 1999). These water bodies and floodplains support some 260 fish species (Rahman 1989).

As in most of the world's fisheries, Bangladesh's inland capture fisheries have been declining in recent years. Population pressure and over fishing are key threats, with many species in decline and 54 species threatened (IUCN Bangladesh 2000). Roads, embankments, drainage, flood control, pollution, factories and towns,

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wetlands conversion, and natural siltation, along with over fishing, are commonly cited as causes of declining fish resources (Ali 1997, Hughes *et al* 1994). These trends continue and are very real threats to wetlands and their productivity.

Local community members working with the Management of Aquatic Ecosystem through Community Husbandry (MACH) project have identified Baikka Beel as an area that could be protected without disadvantaging poor resource users. Because the beel is part of the larger Hail Haor, it is argued that these users could fish and collect aquatic plants in other parts of the 3,000 hectares of water that exist in the haor through the dry season (Chakraborty *et al.* 2005). Protection of Baikka Beel as a sanctuary is undertaken by members of the local community who belong to the Barangangina Resource Management Organization (BRMO) (one of eight such organizations overseen by the MACH project and managing different parts of Hail Haor). The BRMO is comprised of members from 45 villages, including fishers, farmers, women and local leaders. BRMO members follow a management plan that was prepared through consultation with local people and approved by a committee comprised of local officials, *union parishad* (lowest administrative unit in rural areas) chairmen, and leaders of community organizations. With the approval of resource management committees and the local government, MACH program members have successfully excavated select spots in the sanctuary and planted native swamp forest trees to restore a greater diversity of habitats.

Since 2004, fishing, hunting, and collecting aquatic plants have been banned in the sanctuary through the assistance of the community. Sanctuary status has played an important role in increasing fish catches in Bikkha Beel to a level above that of other locations in the haor from 170 kilograms per hectare before any interventions to 390 kilograms per hectare. If wetlands are to survive and the people of Bangladesh are to continue enjoying the visual beauty of wetlands and the flavors of about 260 freshwater fish species, more needs to be done. Declaring areas to 'protected' is relatively easy, but there are numerous examples of areas that are protected on paper but where overexploitation and degradation continue unabated. The Protection and Conservation of Fish Act (1950) restricts using certain gear and fishing for juvenile fish; however, in the absence of any incentives for cooperation by either leaseholders or fishers, enforcement and compliance have been poor (Farooque 1997).

The key lesson to be learned from management experiences in Baikka Beel is not that wetlands can be protected and successfully restored, but how this can be done. Cooperation between residents of different economic status, and between local leaders, councilors, and officials, has been vital. A Fisheries Strategy (DoF 2006) created by the Ministry of Fisheries and Livestock encouraged the development of local institutions for fisheries protection and management. The emphasis of this strategy, as well as the National Fisheries Policy and Water Policy (MWR 1999), is reserving wetlands in order to protect fish.

It is important to establish a forum that brings all stakeholders (including community leaders, policy makers, local government officials, local people, small businessmen,

landowners, teachers, and also poor fishing families and the landless) into a system of resource management that values the benefits of fisheries and wetland biodiversity in haor areas. Community-based fisheries resource management has been practiced in a number of projects around the world and in 116 wetlands in Bangladesh (Mustafa and Halls 2006). The expectation of community-based co-management approaches in fisheries resources management is that they will result in greater security of access and in cooperation leading to enhanced sustainability of resources, more equitable distribution of benefits, improved conflict resolution among fishers, enhancement of fishers' status in relation to other stakeholders, sharing of information between co-managers, and higher levels of voluntary compliance (Pinkerton 1989).

Research aims and objectives

My aim in this paper is to identify the present status of wetland fishers' livelihoods, to determine the benefits they receive from co-management activities, and to gauge their responsibilities in wetland biodiversity conservation and management. Therefore, my objectives are to:

1. To understand the livelihoods of households included in the MACH project as well as households not included in the MACH project in traditional fishing communities;
2. To assess fishers' responses to factors affecting their livelihoods (occupation, education, health, training, credit, market chain, gender development, socioeconomic conditions, and income generating activities);
3. To assess fishers' awareness and knowledge about fish laws and fishery management;
4. To study the access of fishers to water and common property resources.

Background

Hail Haor in the Sreemangal administrative sub-district in northeast Bangladesh is a wetland region fed by fifty-nine hill streams and renowned for its fish and birdlife. The haor covers about 14,000 hectares in the wet season, but in the dry season the area falls to under 400 hectares restricted to about 130 beels and narrow canals. More than 172,000 people in 30,000 households live in sixty villages surrounding the haor. Over eighty percent of those households fish in the haor, many as a regular profession (Chakraborty *et al* 2005). Local people also depend on the haor for grazing and as a wet season source of fodder, building materials, and plants for human food and medicine.

For many years the natural productivity and biodiversity of the haor has been declining because of agricultural drainage, intense fishing pressure, and hunting. The haor has also been threatened by siltation and soil erosion caused by farming practices in the surrounding hills. The life of poor villagers and local residents, who depend on fish and aquatic plants for food and income, has grown increasingly desperate. Households compete fiercely to buy fishing rights from local elites—mostly large landowners and businessmen who control access to beels by purchasing government leases and then charging fishers for access.

Baikka Beel has been reserved by the Ministry of Land as a permanent sanctuary for conserving and maintaining the biodiversity and productivity of Hail Haor. It has since been developed as a safe haven for fish, birds, and other wildlife. Baikka Beel Sanctuary is managed by the BRMO in conjunction with the MACH project through an agreement with the government in order to restore and protect wetland habitat. In addition to protecting the sanctuary members of these organizations educate the broader community concerning the need for its conservation and wise use.

BRMO members seek to ensure sustainable use and protection of the haor and Baikka Beel Sanctuary and to influence resource users to behave responsibly in surrounding areas (CNRS 2007). Members of the BRMO have set up small fish sanctuaries, excavated silted areas, planted swamp forest trees, stocked threatened fishes, stopped harmful fishing practices such as dewatering, and overseen fishing bans when fish are spawning. Baikka Beel has received special protection as a permanent wetland sanctuary and is the largest spawning area of the haor. As a result, the fish catches throughout the haor have doubled and locally extinct fish, birds and plants are returning to the haor.

Study area

The survey was conducted in the Hajipur and Baruna villages of Kalapur Union, part of Sreemangal Upazila in the District of Moulavibazar, Bangladesh. The villages are adjacent to Hail Haor very near Baikka Beel on the west side of the Sreemangal-Moulavibazar Highway, about five kilometers northwest of Sreemangal and twenty kilometers southwest of Moulavibazar Town. Baikka Beel was once famous for its rich capture fisheries, as a very healthy breeding and spawning ground, and as one of the most important fish sanctuaries in Hail Haor. Due to their close proximity to the beel all forty households in the Hajipur and Baruna villages are engaged in fishing as their main occupation; they also depend on their fish catch to meet personal food needs. Gradually declining fish resources have caused village residents considerable hardship. Although some of the households involved with the MACH project are still engaged in fishing, it is becoming a part-time seasonal occupation. This study investigates the livelihoods of fisher households included in the MACH project, as well as those not included in the project in Hajipur and Baruna. Traditionally, residents in both of these villages caught fish throughout the year and sold them to middlemen on the riverbanks or took them to nearby markets by themselves. In this study I look at changes that have occurred as a result of the declining fisheries and the implementation of the MACH project.

Methods

Data for this study were collected using interviews, semi-structured questionnaires and participatory rural appraisal (PRA) methods such as focus group discussions. Forty respondents were selected from among fishers and members of the Federation of Resources Users Groups (FRUG) in the two villages. Twenty of the respondents were participants in the FRUG and the MACH project (MACH fishers), while the other twenty were not participants in either the FRUG or the MACH project (non-MACH fishers). Respondents were interviewed using a semi-structured

questionnaire that utilized blueprint and learning process approaches (Pimbert and Pretty 1995). Fieldwork was conducted over a period of six months from August 2009 to January 2010. All respondents were interviewed, regardless of their participant status. PRA methods were used to get an overview of particular issues such as catching fish, catching fry, marketing, employment, income, credit access, gender disparity, health, and education. In addition, secondary interviews were conducted with as many respondents as possible to cross check answers. Most of the interviews were conducted in fishing areas, the villages, the Resource Management Organization's office, or in local fish markets. Information given by fisher respondents was considered to be representative of their respective households. Therefore, I also collected basic household information and data, including information on income, education, health, capital, occupation, gender issues, and involvement in local institutions (Messer and Townsley 2003).

I also collected secondary data from the Department of Fisheries (DoF), Department of Forest and Environment, Department of Water Resources Development, Department of Agriculture Extension (DAE), Department of Livestock (DoL), WorldFish Center, and other concerned government organizations and NGOs that have been working extensively on fisheries resources management in Bangladesh.

Results and discussion

Participation in Various Development Activities and Response to Laws

Local fishers who participate in the MACH project receive training conducted by the project, the upazila administration, and other NGOs, those non-participants did not receive. This difference may be the reason for divergent responses between MACH fishers and non-MACH fishers when asked about knowledge sharing, previous educational training, and involvement in NGO and governmental programs. Households that participate in MACH projects have more financial and technical support and training. They also have more experience as members of NGOs and government-established organizations. About eighty-five percent of MACH fisher respondents had organizational memberships. Non-MACH fishers, on the other hand, seemed indifferent about the benefits of organizational and institutional memberships. Only thirty-five percent of respondents who didn't participate in the MACH project were members of separate NGO or government-established organization. Data from this study reveals that most of the MACH fishers were regularly updated with information and given opportunities to benefit from knowledge and awareness programs, technology sharing, trainings, and social and cultural activities. Due to the lack of experience with the MACH project, non-MACH fishers spent time catching fish while MACH fishers were involved in self-development activities. Perhaps because they had not been involved in such activities, non-MACH respondents did not perceive themselves to be disadvantaged for not participating. All of the respondents from MACH households were well aware of the fish sanctuary and fish laws, and were moderately aware of and interested in attending trainings and being involved in alternative income generating activities. In addition, a higher percentage of respondents from the MACH group

expressed the importance of participation regardless of gender. On the other hand, many of the non-MACH fishers appeared indifferent about fishing laws and a much smaller percentage showed interest in educational trainings, sanctuary management, and organizational memberships.

Similarly, a smaller percentage of non-participant respondents expressed feelings that increased female participation was important (Figure 1).

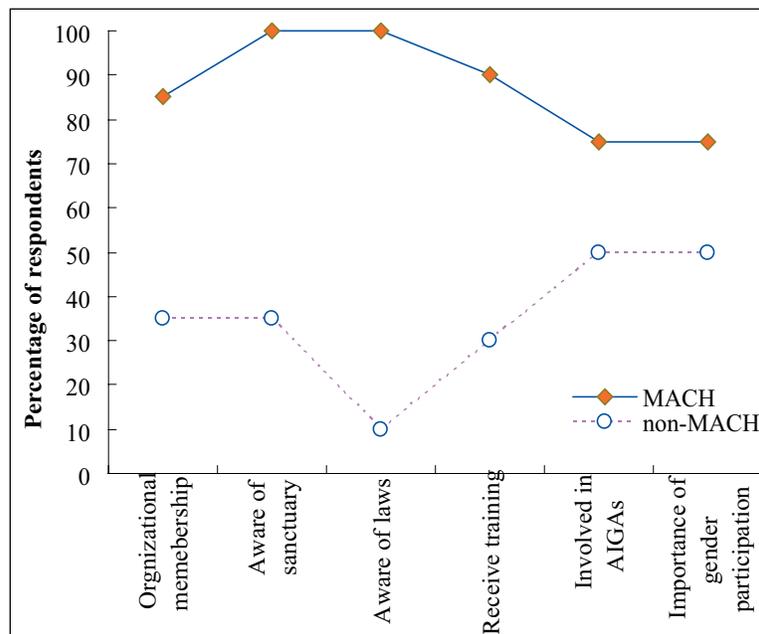


Figure 1: Response by fishers to various development activities and laws

Perceived Usefulness of Co-management Activities

Data from an extensive survey of fishers concerning responsibilities for conserving beel resources reveals that most fishers participating in the MACH project recognize a responsibility to protect existing resources for future use. However, non-MACH fishers reported receiving little information on these issues and responded less frequently on the importance of conserving wetlands. My analysis suggests that the responses of MACH fishers were more thought out and optimistic.

I used nine factors to determine the perceived usefulness of co-management for conserving and managing wetland biodiversity. These are: 1) observing fishing bans; 2) conserving wild birds; 3) beel protection; 4) sanctuary protection; 5) non-use of destructive fishing gear; 6) paying fishing fees; 7) observing annual fish campaigns; 8) seasonal rice cultivation; and 9) controlled use of pesticides. Out of the twenty MACH households, most of the respondents very actively observed closed seasons, supported the conservation of wild birds, and were in favor of stopping the use of destructive gear. In addition, these respondents reported moderate participation in

beel sanctuary protection and management by paying tolls, observing fish campaigns, practicing rice cultivation, and being careful when using pesticides. Non-MACH households, on the other hand, had lower responses regarding these nine factors, as shown in Figure 2.

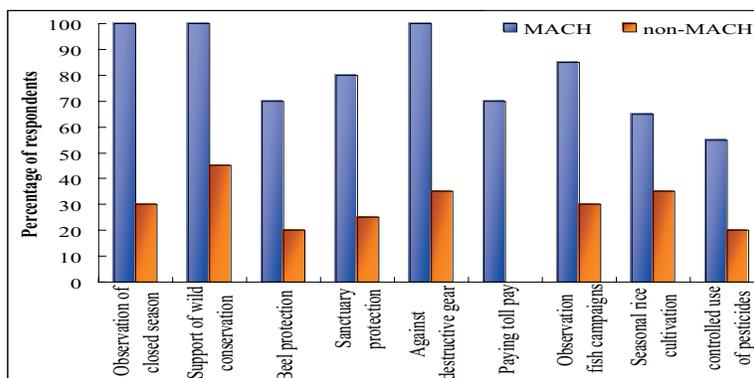


Figure 2: Response by fishers to management and conservation factors

Living Conditions, Livelihood, and Status

Most of the respondents in this study, whether involved in the MACH project or not, experience poor housing conditions. The majority of houses in the villages are constructed adjacent to one another. Landless fishers typically construct their huts on land belonging to their relatives, neighbors, or fellow fishers. Target households in this study were located nearby beel and/or haor areas some distance away from local markets. To determine the quality of housing, a method of categorizing houses by their construction materials was used for this study. Based on the construction materials, homes were categorized into 'temporary' huts made of mud, bamboo, *Nypa* palm leaves for roofing and an earthen floor (*katcha*); 'semi-permanent' houses made of bamboo and wood with a tin roof and concrete floor (*semi-pacca*); and 'permanent' houses made of bricks, roller compacted concrete, and concrete (*pacca*).

The physical condition of homes in Hajipur and Baruna, based on the above categorization scheme, are shown in Figure 3. Out of the twenty households involved with the MACH project, 55 percent live in temporary homes, 35 percent semi-permanent, and 10 percent permanent. In contrast, out of twenty general households not involved in the MACH project, homes are 95 percent temporary and 5 percent semi-permanent, with no permanent homes. In other words, MACH fishers had better quality living facilities.

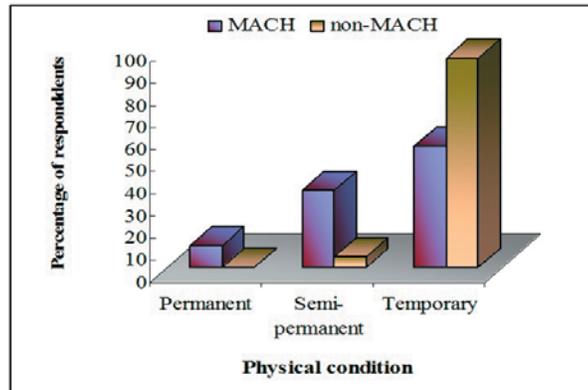


Figure 3: Housing conditions of wetland fishers

Educational status also differed between MACH and non-MACH fishers. Among MACH fishers I found that about ten percent were illiterate and could not write their names, fifty-five percent were semi-literate and could only write their names, and the rest of the fishers (35%) had received some primary education or higher. Conversely, among non-MACH fishers I found that about fifty-five percent were illiterate and could not write their names, twenty-five percent were semi-literate and could only write their names, and the rest of the fishers (20%) had gone to primary school or higher (Figure 4).

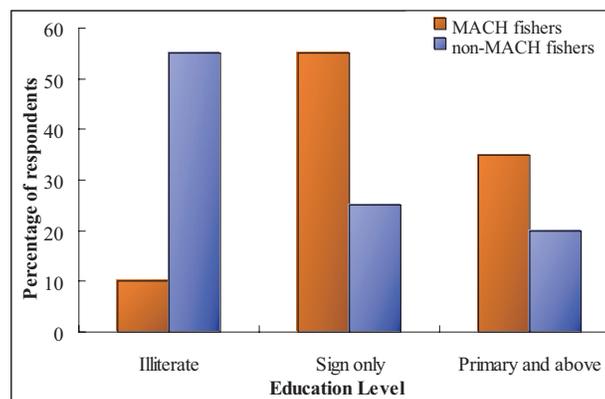


Figure 4: Educational status of respondents

In addition to collecting data on the education level of fishers, I also collected data on the education level of the fishers' families. Out of 136 members of the twenty MACH fisher households, about 1% were found to be illiterate and could not write their names, 14% were semi-literate and could only write their names, 51% had gone to primary school, 17% had studied in secondary school, and 1% went on to tertiary level education. The last 15% were below the age of five ('others'). Out of ninety-one members of the twenty non-MACH households, about 14% were found to

be illiterate and could not write their names, 13% were semi-literate and could only write their names, 38% had studied in primary school, 8% had studied in secondary school and the rest (26%) were aged five-years-old or younger ('others') (Figure 5).

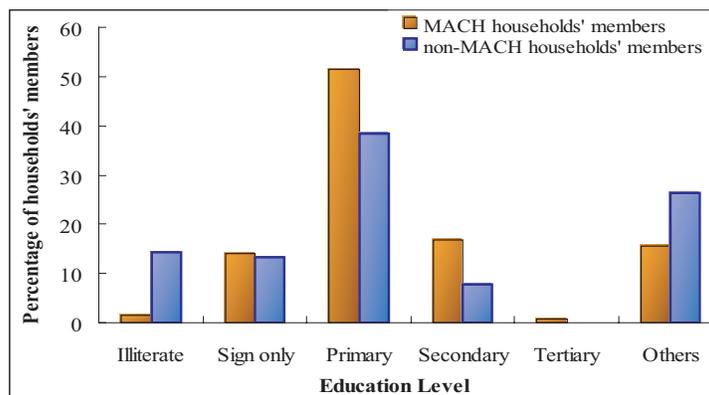


Figure 5: Educational status of households (all household members)

I also analyzed children's education in fisher households. Out of sixty-nine children of the twenty households belonging to MACH fishers, sixty-five (94%) were attending school at different levels, while out of thirty-three children of the twenty non-MACH households, twenty-three (69%) were still getting an education. About 61% of the participant household children that attended primary school completed it, and 30% also completed their secondary level education (up to Secondary School Certificate, SSC), 3% attended tertiary level school (above SSC), and 6% dropped out before completing their primary education (Figure 6).

Children's education levels in non-MACH households were considerably different. Although 58% of the children completed their primary level education (similar to the MACH fisher group), only 12% attended secondary level school (up to SSC), and no children in the sample attended tertiary level school. The most significant statistic is that 30% of the children from non-MACH households dropped out of school before completing their primary education (compared to only 6% for children from MACH households). Rahman (1994) notes that in Bangladesh most of the fishers are illiterate and only a few have a primary level education. This study reveals that most MACH and some non-MACH fishers want their children to receive an education so that they can obtain good employment and thus improve their social and economic status. However, often non-participant fishers pull their children out of school to fish in order to help support the family.

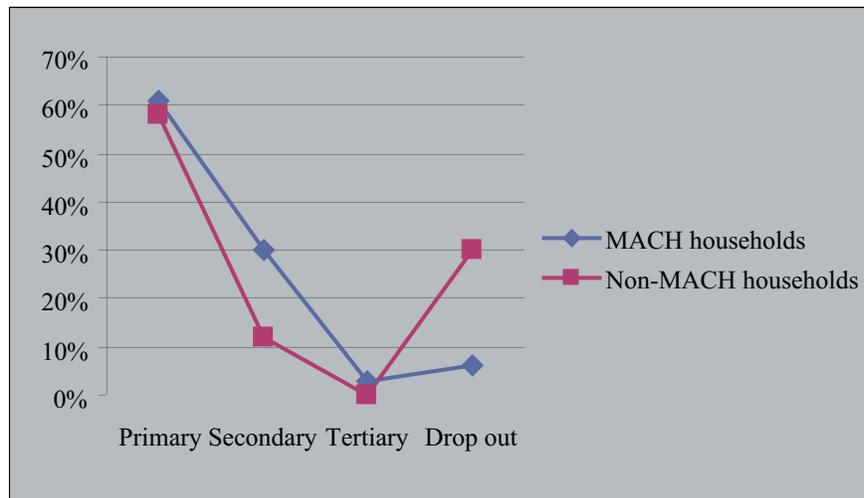


Figure 6: Educational status of respondents' children

Through my study survey I identified the primary occupations of MACH and non-MACH fishers in Hajipur and Baruna villages. Analysis revealed that out of the participant households 30% are engaged in fishing as their main occupation, 20% in livestock rearing, 9% in fish cultivation, 16% in agriculture, 7% in work in government or non-governmental institutions, and 18% in business (Figure-7). Among non-MACH households 63% are directly involved in fishing, 19% in cattle rearing, and only a few households in other activities (Figure 8). These data demonstrate that fishers who participate in the MACH project are engaged in other occupations (cattle rearing, occasional fishing, agriculture, and other businesses) apart from their main occupation of fishing. MACH fishers receive physical and financial supports from the MACH project and others organizations. They also receive trainings organized by the MACH project, the upazila administration, and others NGOs. They thus have a means of gaining financial support from their FRUG cooperatives. However, non-MACH fishers often show indifference about gaining assets, savings, training, and others financial inputs from sources unrelated to fishing.

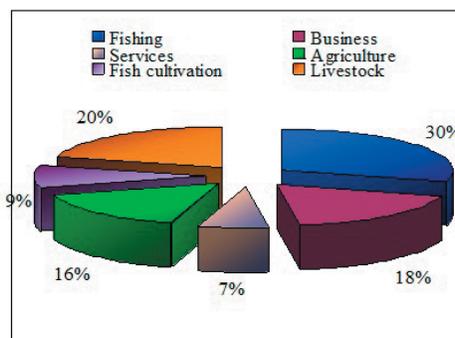


Figure 7: Occupations of MACH households

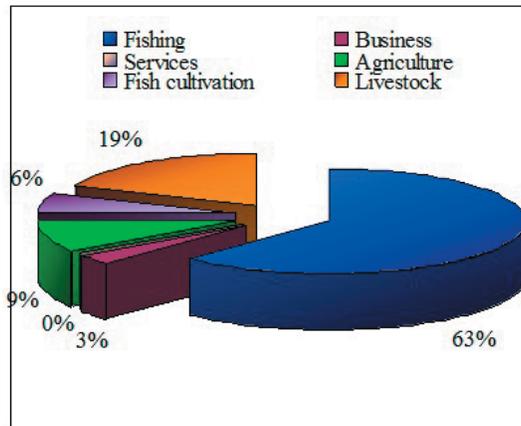


Figure 8: Occupations of non-MACH households

Fishers in the study area face severe health and sanitary problems, which are amplified by the fact that there is no local hospital. Therefore, people often suffer from diarrhea, fever, and other diseases. The nearest health center is at Sreemangal, about eight kilometers away, but there are no efficient means of transportation from the village to this or other urban areas. On the other hand, there is no lack of drinking water in the villages. A few of the wealthier households own tube wells that can be used by neighbors so most fishers use tube-well water for drinking and other household purposes.

Though clean drinking water doesn't appear to be an issue, this study suggests that fishers near Hajiur and Baruna lack knowledge of and proper access to health and sanitation. There are no latrines in some of the households in the village, and as a consequence, fishers suffer from various infectious diseases. As part of this study I analyzed which types of latrines are used by fishers from Hajipur and Baruna and divided them using the following categories 1) permanent (pacca), made of bricks and concrete; 2) semi-permanent, made of bricks and tin or leaves; 3) temporary (katcha), made of packed earth; and 4) no latrine. Among MACH fishers household latrines could be categorized as follows: about 20% permanent, 60% semi-permanent, 20% temporary, and 0% no latrine; among non-MACH fishers categories of latrine were 0% permanent, 30% semi-permanent, 55% temporary, and 15% no latrine (Figure 9).

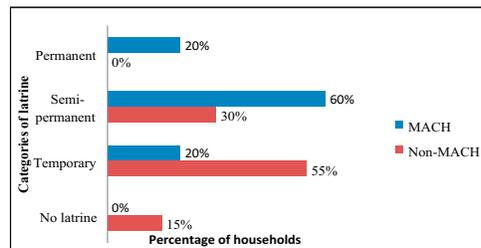


Figure 9: Latrine quality among participant and non-participant households

Socioeconomic Conditions of Fishers

There is no set marketing chain in the villages of Hajipur and Baruna. Marketing channels vary from season to season and place to place. Any person can purchase or sell fish to any other person, however the general pattern of the marketing chain begins with local fishers selling their fish to middlemen, known as *foria*. The *foria* bring fish to wholesalers, who then sell the fish to retailers through auctions. Retailers then sell fish to consumers at market places (Figure 10). There is no licensing system for fish retailers and middlemen. Fishers and fish farmers can sell their fish directly to wholesalers or even to consumers. However, lack of transportation constrains local fishers from selling directly to consumers in the city market.

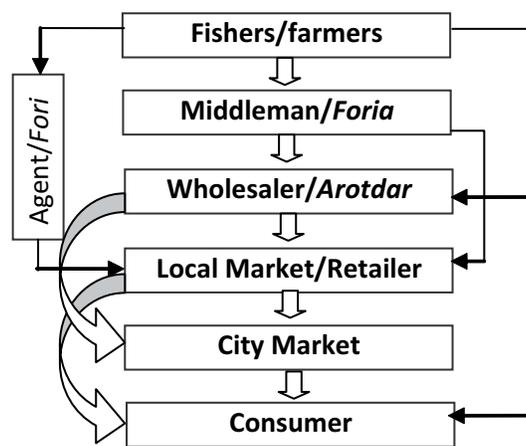


Figure 10: Local supply chain of fish marketing

In this study respondents revealed that most fishers bring their fish catch from the beel by foot to local markets approximately six to eight kilometers away. For this reason, some of the fishers sell to middlemen closer to the beel. These fishers receive the prices lower than those they could receive by selling directly to consumers at the market. Almost all of the fishers find it challenging to make a living given the low cost of fish coupled with decreasing catch sizes. Poor fishers in

Bangladesh have challenging lives due to the nature of fishing as a profession. These fishers are made more vulnerable due to factors such as lack of capital, lack of preservation and processing facilities, and uncertainty in fish marketing and pricing systems.

Traditionally although fishing is the major and, in some cases only, source of income for fishers, individuals occasionally undertake a variety of supplementary activities which constitute a substantial part of their annual income. These income-augmenting opportunities, however, are limited. Fishery-related activities carried out in the village include fish marketing and trading, gear and craft maintenance, and repair. In addition, there are limited options for non-fishery related activities such as wage labor in other sectors like agriculture, construction, and livestock and poultry farming.

The highest average daily income among MACH households was 872 BDT (12.52 USD) and the lowest was 125 BDT (1.79 USD). According to my analysis the average daily income of MACH households is as follows: 125-150 BDT (1.79-2.15 USD) (25%); 150-200 BDT (2.15-2.87 USD) (25%); 250-300 BDT (3.59-4.31 USD) (20%); 300-400 BDT (4.31-5.75 USD) (10%), above 400 BDT (5.75 USD) (40%).

The highest average daily income was 256 BDT (3.68 USD) and the lowest was 103 BDT (1.48 USD). My analysis of non-MACH households also revealed that about eighty percent of households had an average daily income of between 103-150 BDT (1.48-2.15 USD), and the remaining twenty percent of the households' average daily income was between 150-250 BDT (2.15-3.59 USD).

The income of marginal fishers has decreased over the years due to reduced availability of carp and other fish in the haor. Moreover, every year more people from neighboring communities are getting involved in fishing as a seasonal or part-time occupation. As a result, fishing pressure is continuously increasing. In addition, environmental degradation caused by late rains, heavy river siltation, agricultural and industrial pollution, and other environmental factors further intensify the problem. The consequence has been a decline in fish populations that has thrown the fishers into hard times.

My analysis of the monthly average incomes of MACH and non-MACH households shows that the gross average income of MACH households is comparatively higher than non-MACH. The highest average monthly income over a six month period was 26,167 BDT (376.78 USD) for MACH households and 7,667 BDT (110.40 USD) for non-MACH, while the lowest was 3,750 BDT (54.00 USD) and 3,083 BDT (44.39 USD) respectively. It is also apparent that although there was a spectrum of monthly incomes, on average MACH households made more than non-MACH households (Figure 11). Income variation between months was also greater for MACH households, while the average monthly income of non-MACH households was more or less steady. In the MACH group, thirty percent of the households depend solely on fishing, with the remaining households generating income from other activities such as agriculture, cattle rearing, fish cultivation, poultry, small businesses, and various other services. On the other hand, sixty-three percent of non-MACH fishers depended solely on fishing. Thus, involvement in alternative income generating activities was relatively higher in MACH than non-MACH households.

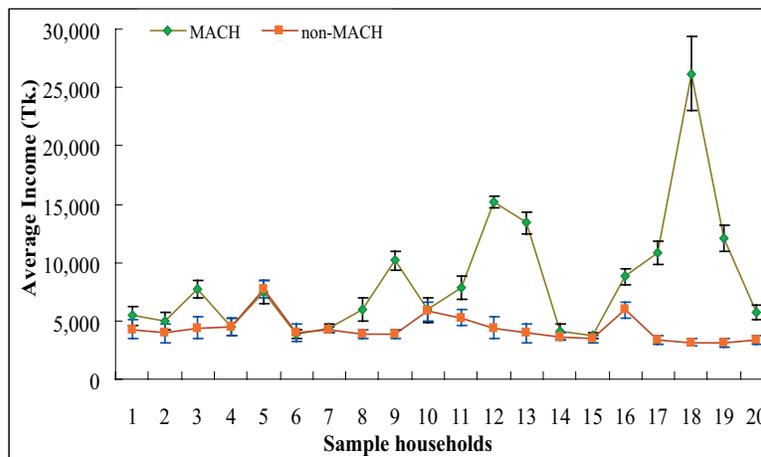


Figure 11: Average monthly income of MACH and non-MACH households from fishing, fishery-related activities, and non-fishery-related activities

In order to understand levels of dependency within fisher households I calculated a dependency ratio by dividing the total number of dependent household members by the total number of household members that earn a living. In this case, dependent members refer to those family members who have no principal occupation (including students). The percentages of earners to dependent members of the fisher's households were 1 to 2.24 for MACH households and 1 to 2.96 for non-MACH households. The data from this part of the study show that out of 136 members of MACH households, about 94 dependents (69%) rely on 42 earners (31%). On the other hand, out of 91 members of households not participating in MACH, about 68 dependents (75%) rely on 23 earners (25%). It is evident that non-MACH fishers have a relatively higher dependency ratio than participant fishers (Figure 12).

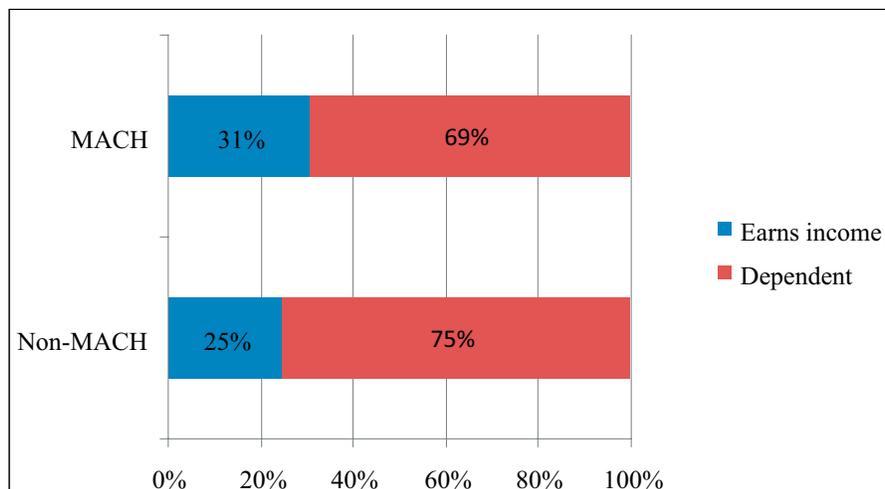


Figure 12: Dependency ratio of among participant and non-participant households

Though ownership of fishing and non-fishing assets among fishers is limited, most MACH fishers have been able to develop their assets through physical and financial support from cooperatives and other organizational activities and projects. Based on a study of the socioeconomic conditions of fishing communities in Bangladesh, Hannan (1994) states that fishers are a highly neglected class in society and lived a-hand-to-mouth. The present study both confirms and challenges Hannan's conclusion. Survey results from this study reveal that MACH fishers who own their nets and boats enjoy self-employment and get comparatively more remuneration than non-MACH or hired fishers. However, I also found that most of the non-MACH fishers cannot afford three meals a day for their families.

The lean season (mid-May to mid-October) is the hardest time of the year for fishers. During this season, there is a fishing ban in Baikka Beel. The beel area shrinks and becomes crowded by aquatic weeds and the floodplain becomes completely dry. The fishable water areas shrink, and most of what remains belongs to the sanctuary. As a result, fishers face unemployment and have little choice but to become day laborers in the agricultural and construction sectors. In addition, some fishers have migrated

to urban areas for work either temporarily or permanently. Meanwhile, some relatively better-off MACH fishers have been able to save some money during the peak-fishing season and through other income-generating activities. This has enabled them to invest their money in fish trading, agriculture, and others business ventures during the off-season. The main constraints on improving fishers' living standards are lack of inputs and persistent debt to the usurious traditional credit system, which binds them to their communities and occupation (Ruddle 1994).

Informal and formal credit markets are sources of financial capital that are available to poor fishers. The chief actors in the informal credit market are local moneylenders, while NGOs are the main providers of formal credit. Fishers in the study area have no access financial credit offered through banks because of a lack of sufficient collateral. Local moneylenders lend money with interest rates for which there is no regulation, meaning that rates vary widely between seasons and from lender to lender. In spite of this, fishers have easy access to credit from moneylenders with flexible repayment terms so these loans can be used for a wide range of needs. On the other hand, national and local NGOs provide credit only to their members and only offer subsequent loans after full repayment. It is often argued that the amount of credit being provided by NGOs is insufficient and is not commensurate with the actual needs of poor people. Fishers reported that the primary problems with the micro-credit systems of NGOs are 1) weekly installment system; 2) inflexibility of credit recovery periods; 3) insufficient amounts of credit to invest in fishing and other fishery-related activities; and 4) high rates of interest. Respondents stated that they generally use loan money to procure inputs for fishing and non-fishing activities like beef fattening, cattle rearing, poultry raising, house building, and marriage expenses. These activities do not generate income on a regular, weekly, or even monthly basis. As a result, fishers must defer repayment of loans. However, due to persistent demands for installments by NGO representatives, many households have to turn to informal credit markets or sell their assets in order to pay back NGO loans. Wealthier fishers in the study areas also act as moneylenders for fellow fishers. MACH fishers are better off, because they have been directed by MACH on how to build cooperatives for savings. They can use cooperative financing for a given time span when needed at a pre-set rate of interest, which is the same for all fishers. In addition, BRMO has helped organize and manage the financial dealings among the cooperatives.

Gender Participation

Gender inequality is prevalent in every sphere of life in the study area. Biases prevail between sexes in regards to household responsibilities, cooking, washing, decision-making, income, and education. From birth, girls are considered less capable than boys in their ability to earn an income and in other ways as well. Unequal treatment of females and gender discrimination are common in Bangladesh's traditional fishing societies. There is a general preference for sons because it is thought that boys will grow up to join their fathers in fishing and will earn money for the family while girls will only add responsibilities and financial burdens.

In fishing communities, girls typically get married between the ages of twelve and fifteen. After marriage, women are encumbered with responsibilities in their own as well as their in-law's households. It is typical for women to eat their meals after feeding everyone else in the family. This study reveals that about sixty percent of cooking and over ninety percent of washing is done by females. Males remain engaged in fishing and non-fishing activities for eight to ten hours a day, while housewives are busy for fifteen hours or longer each day maintaining the entire household. Despite this, society shows considerable reluctance to recognize the importance of the work that women do for their families. Rural women in Bangladesh have long been an unrecognized contributor to economic productivity (Ahmed *et al* 1996). This study shows that forty-five percent of MACH household females and thirty percent of non-MACH females took part in decision-making in family matters. Even if housewives earned some money through income-generating activities like rearing cattle or poultry, in many cases they did not possess the freedom to spend the money for themselves or even for something of their own choice. My analysis suggests that about fifteen percent of females in MACH households and eight percent of those in non-MACH households contributed to family earnings (Figure 13).

Concerning educational status responses suggest that girls have far less opportunity for schooling than boys. About twenty-four percent of girls in non-MACH households get the chance to go to school whereas forty percent of MACH household girls go to school. Fishers have a positive attitude about educating male children, but female education beyond primary school is still unthinkable among most fisher families. This is largely due to early marriages and the lack of social security for female children.

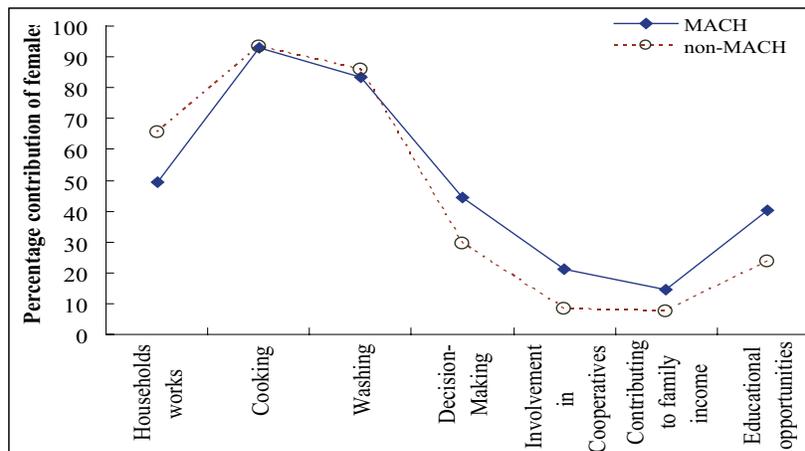


Figure 13: Females' involvement in various household and socio-economic activities

Training programs

Training programs are a part of the repertoires of many NGOs that are meant to empower local resource users. As part of my study I examined training programs

designed within the MACH project that focus on different subjects. Training programs were facilitated through the BRMO and created specifically for the FRUG. In order to analyze the training programs, I collected data from individuals who are members of the FRUG (here labeled 'MACH fishers'). MACH fishers received training on group management, leadership, nutrition, health, agriculture, fisheries, and livestock organized by MACH, the upazila administration and NGOs such as CARITAS and BRAC. Meanwhile, non-MACH fishers received some similar training from organizations other than the MACH project and they were engaged in cooperatives. The MACH project offered training to FRUG members on how to develop income generating activities so that they can survive periods of lean fishing and be empowered to seek and develop other sources of income. MACH fishers also received training on agriculture (80%), fisheries (75%), and livestock (70%) which are considered common alternative sources of income. Finally, they also received training on group management, leadership, and nutrition and health issues. Conversely, non-MACH fishers had few chances to benefit from these types of trainings. However, non-MACH fishers involved in other organizations and/or cooperatives did have some training opportunities. The figure below shows the trainings attended by both MACH and non-MACH fishers (Figure 14).

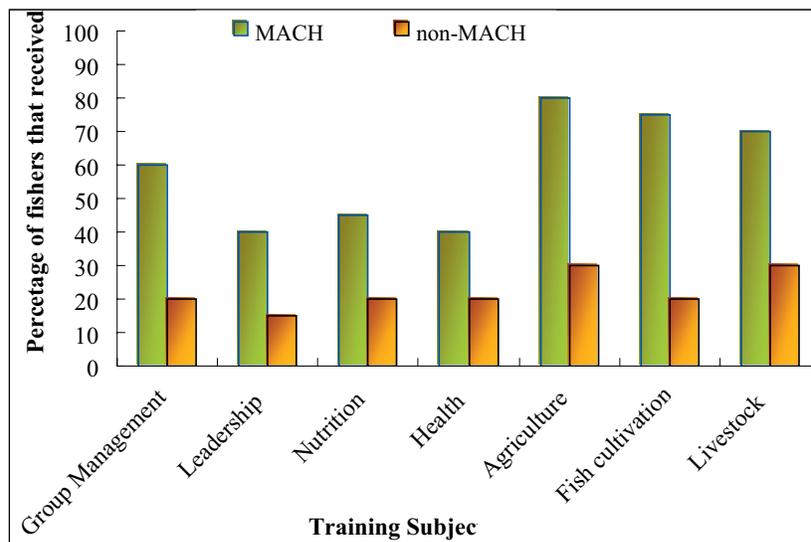


Figure 14: Percentage of fishers receiving various trainings

Conclusion

Future management and development plans for Baikka Beel and Hail Haor need to be geared towards improving the socio-economic condition of local people while also conserving and restoring the environment upon which fisheries (and fishers) depend. The beels adjacent to fishing communities are important components of this region's ecosystem. There are several fisher groups in Baikka Beel that traditionally engage in fishing as their full time occupation. The results of this study suggest that the livelihoods of MACH fishers are better than those of non-MACH fishers, and

according to some indicators far better. There are differences between MACH and non-MACH fishers regarding resource use, access to alternative income generating activities, socioeconomic status, and social perspectives. Development activities appeared to have a considerable impact on the quality of people's livelihoods and fishing practices. Based on the data I've presented in this paper I conclude that MACH fishers are doing better than non-Mach fishers in terms of income, assets, and food security. The problems faced by communities in Baikka Beel likely reflect problems faced by traditional fishing communities throughout the country. To make a positive impact on the socio-economic conditions of fishers, it is essential that living standards, health and sanitation, housing, education, and credit availability are all improved and that there are an increased number of alternative employment and income-generating activities for fishers during off-seasons. Moreover, fishers would benefit from trainings and technical support through different government and non-government organizations.

This study is encouraging because it suggests that the livelihoods of MACH fishers have improved as a result of initiatives and activities supported by the Bangladeshi government, NGOs, the upazila administration, local government agencies, and the efforts of community members themselves. Thus, with careful planning, institutional development and community co-management of natural resources can make a positive impact on the livelihoods of fishers.

In depth, long-term studies are urgently needed to gain greater insights into the livelihood needs of fishers and ways to empower this traditionally marginalized group. Such research is important for biodiversity conservation and natural resource management too. This kind of research is needed both for planning and for raising awareness amongst policymakers, government agencies, NGOs, and the general public. Well-informed natural resource and development planning will lead to increased protection of biodiversity and help people whose livelihoods depend on natural resources find more sustainable livelihood approaches for the future.

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